

I Claim:

1. A frequency generating system for a mobile radio transceiver operating in two radio frequency (RF) bands spaced apart from each other, comprising:

a transmitter having an intermediate frequency (IF) filter;

a receiver having a common highly selective IF filter; and

a single voltage controlled oscillator (VCO) connected to said transmitter and said receiver, said voltage controlled oscillator outputting two mutually offset local-oscillator frequency bands including a lower local-oscillator frequency band and a higher local-oscillator frequency band having a higher frequency than the lower local-oscillator frequency band, said transmitter generates a transmit signal, conducted through said IF filter, and with an aid of the lower local-oscillator frequency band the transmit signal is converted into an upper transmit frequency band and a lower transmit frequency band, respectively, and a signal received in an upper receive frequency band and a lower receive frequency band, respectively, in said receiver is converted with an aid of the two mutually offset local-oscillator frequency bands into a receive IF, a frequency conversion into and, respectively, out of an upper band being effected with the lower local-oscillator frequency band and into and,

respectively, out of a lower band being effected with the higher local-oscillator frequency band, said common highly selective IF filter being provided for filtering out an IF signal for both the upper band and the lower band in said receiver, the higher local-oscillator frequency band exclusively provided for converting the upper receive frequency band into the receive IF and the lower local-oscillator frequency band provided both for converting the lower receive frequency band into the receive IF and also for converting the transmit signal from an IF into a RF transmit frequency in the upper transmit frequency band and the lower transmit frequency band, an upper transmit IF for conversion into the upper transmit frequency band being identical to a lower transmit IF for conversion into the lower transmit frequency band, and that a percentage frequency difference between the two mutually offset local-oscillator frequency bands is of such a magnitude that both the lower and higher local-oscillator frequency bands can be generated by said single voltage-controlled oscillator functioning as a local oscillator, said voltage-controlled oscillator having a resonator which is electronically switched in a manner of a so-called "band-switched" VCO during band switching without significant impairment of noise characteristics in at least one of the upper and lower local-oscillator frequency bands.

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2. The frequency generating system according to claim 1, wherein the percentage frequency difference between the two mutually offset local-oscillator frequency bands is at most 10%.

3. The frequency generating system according to claim 1, wherein:

a first frequency spacing between a lower end of the lower receive frequency band and a lower end of the lower local-oscillator frequency band is equal to a second frequency spacing between an upper end of the upper receive frequency band and an upper end of the higher local-oscillator frequency band;

the first frequency spacing and the second frequency spacing are in each case equal to the receive IF which is common to the upper and lower bands;

a third frequency spacing between a lower end of the lower transmit frequency band and the lower end of a range of the lower local-oscillator frequency band used for transmitting in the lower frequency range is equal to a fourth frequency spacing between an upper end of the upper transmit frequency band and the upper end of the lower local-oscillator frequency band; and

the third frequency spacing and the fourth frequency spacing are in each case equal to the transmit IF which is common to the two bands and is identical, the transmit IF is equal to a sum of the receive IF, a duplex frequency corresponding to an offset between the lower transmit frequency band and the lower receive frequency band and a difference frequency which corresponds to approximately half a difference between a width of the upper transmit frequency band and a width of the lower transmit frequency band.

4. The frequency generating system according to claim 3, wherein:

the lower local-oscillator frequency band has a width corresponding to the width of the upper transmit frequency band;

a range of the lower transmit frequency band is centrally located in the range of the lower local-oscillator frequency band used for conversion; and

the range of the lower local-oscillator frequency band used for converting the lower receive frequency band is disposed at the lower end.

5. The frequency generating system according to claim 1, wherein widths of the lower transmit frequency band and the lower receive frequency band are identical to one another and that widths of the upper transmit frequency band and the upper receive frequency band are also identical to one another.

6. The frequency generating system according to claim 1, wherein the lower transmit frequency band is at a first fixed frequency spacing below the lower receive frequency band and the upper transmit frequency band is at a second fixed frequency spacing below the upper receive frequency band.

7. The frequency generating system according to claim 5, wherein:

the lower transmit frequency band has a range of 880-915 MHz;

the lower receive frequency band has a range of 925-960 MHz;

the upper transmit frequency band has a range of 1710-1785 MHz; and

the upper receive frequency band has a range of 1805-1880 MHz.

8. The frequency generating system according to claim 7, wherein the two mutually offset local-oscillator frequency

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bands have a width of in each case 75 MHz, the receive IF is 360 MHz and the transmit IF is 425 MHz.

9. The frequency generating system according to claim 1, said voltage controlled oscillator receiving a logic signal which deviates from a band switching signal, a state of the logic signal depending on an operating mode to be switched on and is provided for selecting between which of the two mutually offset local-oscillator frequency bands is output.

10. The frequency generating system according to claim 1, including an integrated circuit chip and said transmitter, said receiver and said voltage controlled oscillator are embedded in said integrated circuit chip.

11. The frequency generating system according to claim 1, wherein the two RF bands are in the 900 MHz and 1800 MHz range.

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